ESTABLISHMENT OF A NEW GENUS IN THE FAMILY PHOXOCEPHALIDAE (CRUSTACEA: AMPHIPODA) AND A DESCRIPTION OF A NEW SPECIES FROM NORTH ISLAND, NEW ZEALAND

By ANTHONY A. FINCHAM

SYNOPSIS

A new genus, *Waitangi*, of phoxocephalid amphipod is diagnosed with *Paraphoxus rakiura* Cooper & Fincham, 1974 as type-species. *Waitangi brevirostris* n. sp. is described; the new material was collected from sandy beaches in North Island, New Zealand.

INTRODUCTION

WITH THE notable exception of the Talitridae (Hurley, 1956, 1957) few of the intertidal sand-dwelling species of amphipods have been described from beaches in New Zealand. Hurley (1954) listed five genera and six species of Phoxocephalidae recorded from New Zealand. More recently algae-dwelling species have been collected and figured by Barnard (1972), and Cooper (1974) has described infaunal species from Wellington Harbour, some of which also live intertidally (Fincham 1974). Four new species of intertidal, infaunal amphipods have been described recently (Cooper & Fincham 1974) from Stewart Island and from beaches in the Auckland area; the present paper adds a further species belonging to the Phoxocephalidae.

Fourteen beaches were visited in North Island from March 1972 to November 1973. Collections were made as part of a general ecological survey of Crustacea Peracarida of the intertidal sand biotope of New Zealand (Fincham 1974; in press). Beach sediments examined ranged from black ironsand at Onaero on the west coast to the pale pumice sand at Mt Maunganui. The new phoxocephalid was found in conditions varying from very exposed (Baylys Beach) to partially protected (Paraparaumu Beach).

Abbreviations used throughout: MLWN – mean low water neaps, LMB – low mid beach, HMB – high mid beach. Where measurements are given, articles were measured along the midline (length) and at right angles to the midline at the widest part (breadth). Total length of the amphipod was measured from the tip of the rostrum to the tip of the telson after straightening the body.

Bull. Br. Mus. nat. Hist. (Zool.) **31**, 6 *Issued* 30 *June*, 1977

DESCRIPTION OF GENUS AND SPECIES

FAMILY **PHOXOCEPHALIDAE**

Waitangi n. g.

DIAGNOSIS. Rostrum abruptly narrowed or absent ; article 2 of gnathopods narrowing distally ; article 2 of pereiopod 7 with ventral and lateral setae ; molar of mandible semitriturative, bearing four spines ; rami of uropods 1, 2 with apical spines (not a nail).

TYPE-SPECIES. *Paraphoxus rakiura* Cooper & Fincham, 1974 : 168–73, figs 7a, 8–10.

ETYMOLOGY. *Waitangi* is derived from the place name of the Treaty of 1840 at which Maori chiefs ceded land to Queen Victoria.

REMARKS. Bearing in mind the combination of the four phoxocephalid genera *Pontharpinia* Stebbing, 1897, *Parharpinia* Stebbing, 1899, *Protophoxus* K. H. Barnard, 1930 and *Trichophoxus* K. H. Barnard, 1930 as subjective synonyms of *Paraphoxus* Sars, 1895 by J. L. Barnard (1960) a new species of New Zealand phoxocephalid was designated *Paraphoxus rakiura* by Cooper & Fincham (1974). In a recent paper, however, by Barnard & Drummond (1976) these four genera, together with *Metharpinia* Schellenberg, 1931, were reinstated following an examination of Australian phoxocephalid material. In the same paper Barnard & Drummond suggest that the distinctive New Zealand form *Paraphoxus rakiura* Cooper & Fincham should be established in a new genus '. . . to differ from *Trichophoxus* in the presence of setae on the peduncle of uropod 1, the pattern of the various ornaments on uropods 1–2, and the giant tooth of epimeron 3 . . .'. In addition the extreme abbreviation of the rostrum, shape of gnathopod article 6, setation of article 2 pereiopod 7, together with the pattern of spines on uropods 1, 2 have been used in the generic diagnosis. However, the shape of the third epimeral plate has not been included because of the interspecific variability of this character, not uncommon in amphipods, that is demonstrated clearly by the new species described below.

Waitangi brevirostris n. sp.

(Figs 1–3)

DIAGNOSIS. Rostrum absent ; gnathopod article 6 broad, shorter than article 5, narrowing distally for about half its length to a weakly chelate palm ; pereiopod 7 with article 2 reaching just beyond distal margin of article 5, with a well-defined field of long setae medially and scattered short setae ; uropods 1, 2 with spines along the length of the peduncle ; epimeral plate 3 truncated with small notch at junction with somite.

DESCRIPTION. Length 5·5–7·7 mm (female), body fusiform, broad, dorsally flattened, laterally expanded (Fig. 1) ; cream in colour.

Coxal plates 1–5 rather large ; coxal plate 1 (Fig. 2n) produced slightly forward, group of short setae at antero-distal corner, longer setae at postero-distal corner ;

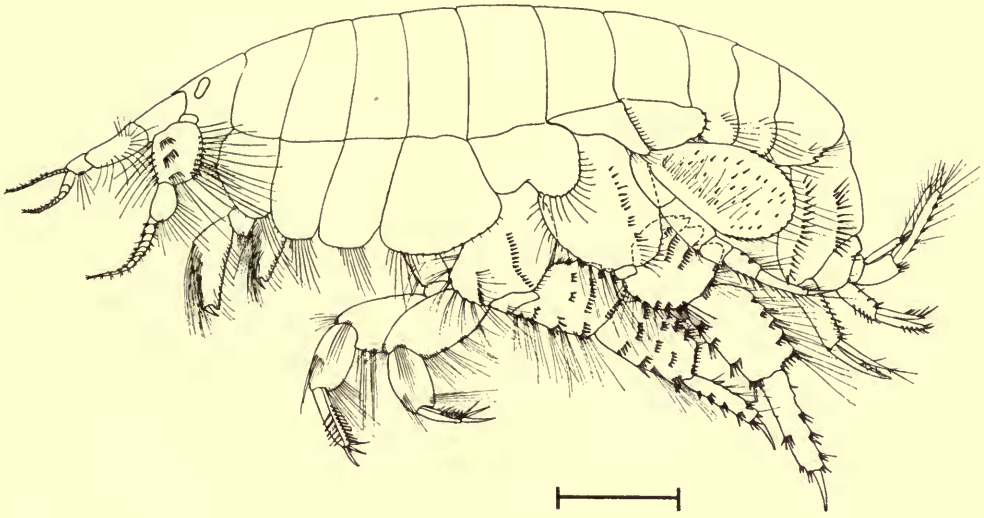

FIG. 1. *Waitangi brevirostris* n. sp. adult female. Bar scale = 1·0 mm.

marginal setules between these two groups; plates 2, 3 (Figs 2q, s) with group of setae at postero-distal corner, 2–3 setules on anterior distal edge; plate 4 (Fig. 3b) group of setae at anterior distal corner, smaller setae along ventral margin; plates 5–7 (Figs 3c, d, e) small, lobed, with marginal setules.

Epimera plate 1 (Fig. 4d) group of fine plumose setae on anterior distal margin, simple setae in postero-distal corner and postero-laterally; plate 2 (Fig. 4e) with simple setae in postero-distal corner, distal margin and postero-laterally; plate 3 (Fig. 4f) truncated in postero-distal corner, small notch on posterior edge at junction with somite, marginal postero-ventral setae, group of setae dorsal and ventral to notch.

Head (Fig. 1) wide, rostrum absent, lateral lobes moderately produced; eyes moderate in size, black visual elements bleaching somewhat in spirit.

Antennae (Figs 2b, c) short, less than $\frac{1}{3}$ length of body, antenna 2 a little longer than 1; antenna 1 peduncle article 1 large, ventral distal margin armed with plumose seta and group of small spines, articles 2, 3 with arrays of moderate to long setae; flagellum and accessory flagellum sub-equal in length, each of 12 segments, 8 distal segments bearing small setae; antenna 2 with peduncle article 2 robust heavily setose and spinose, flagellum shorter than peduncle, with 14 segments, moderate in length, all bearing short setae.

Upper lip (Fig. 2e) entire, margin rounded.

Mandible bulbous, molar bearing four spines (Fig. 2f, g), palp of three articles, terminal article with group of distal setae.

Maxilla 1 (Fig. 2h) inner plate bearing three sparsely plumose setae distally, outer plate with a row of spines distally, palp biarticulate, article 2 with an apical group of setae.

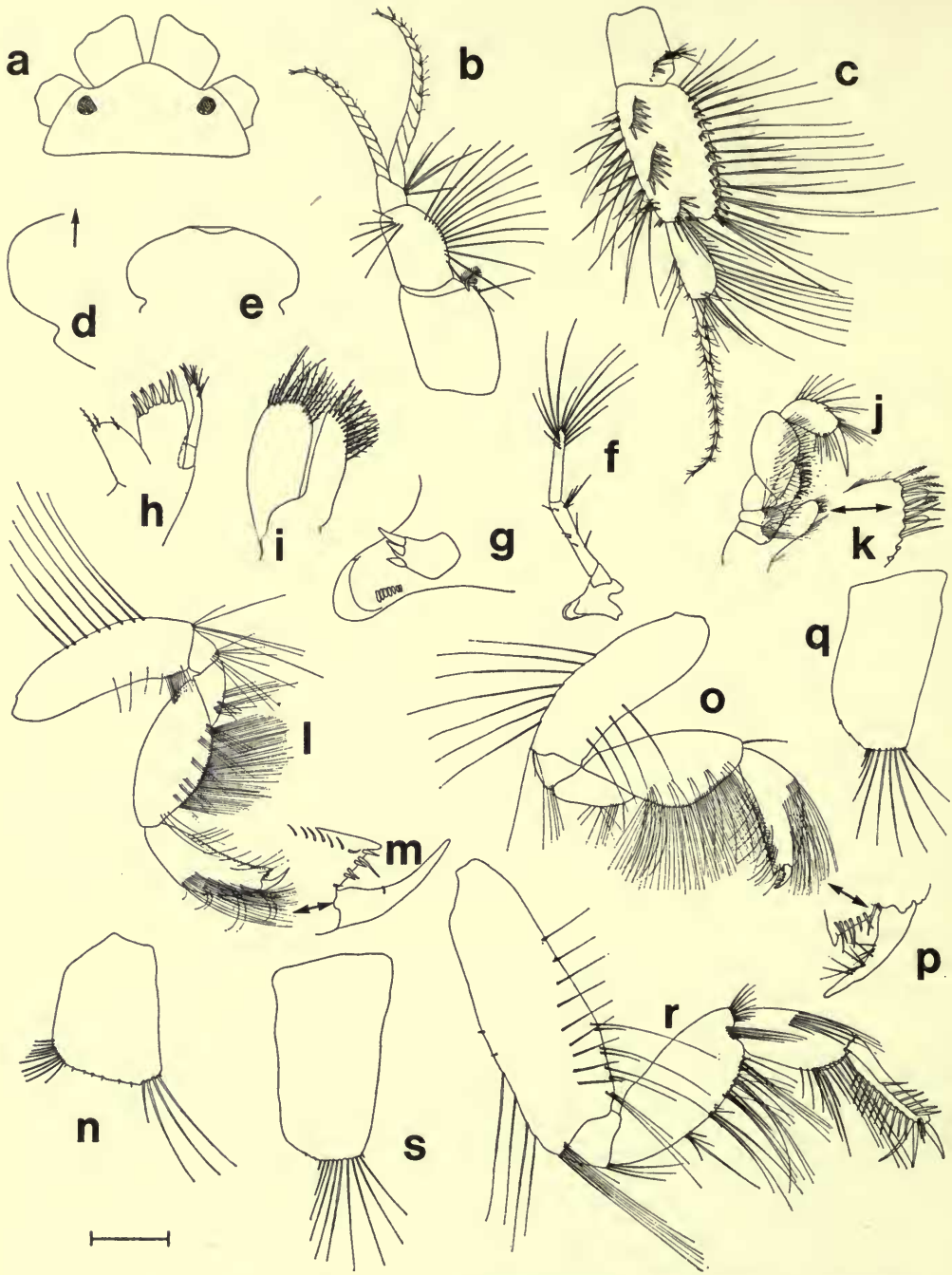

FIG. 2. *Waitangi brevirostris* n. sp. adult female. (a) dorsal view head ; (b) antenna 1 ; (c) antenna 2 ; (d) epistome (sketch) ; (e) upper lip ; (f) mandible ; (g) mandibular molar ; (h) maxilla 1 ; (i) maxilla 2 ; (j) maxilliped ; (k) maxilliped inner plate ; (l) gnathopod 1 ; (m) gnathopod 1 palm ; (n) coxal plate 1 ; (o) gnathopod 2 ; (p) gnathopod 2 palm ; (q) coxal plate 2 ; (r) pereiopod 3 ; (s) coxal plate 3. Bar scale : a = 0·5 mm, b, c, f, j, l, o, q, r, s = 0·4 mm, e, h, i = 0·2 mm, g, k, m, p = 0·1 mm.

Maxilla 2 (Fig. 2i) inner and outer plates rounded distally with groups of sparsely plumose setae distally.

Maxilliped (Fig. 2j, k) inner plate with plumose setae and two stout, distal spines ; outer plate normal ; palp article 4 simple.

Gnathopods 1, 2 (Figs 2l, m, o, p, Table 1) densely setose, dactyl of gnathopod 2 with setae facing palm.

TABLE 1

Ratio of length to breadth of articles 5 and 6 in gnathopods 1 and 2

Article	5 L : B	6 L : B
Gnathopod 1	50 : 25	43 : 18
2	49 : 28	42 : 18

TABLE 2

Ratio of length to breadth of articles 2–6 in pereiopods 5–7

Article	2 L : B	3 L : B	4 L : B	5 L : B	6 L : B
Pereiopod 5	103 : 72	21 : 20	59 : 74	72 : 58	66 : 14
6	104 : 96	14 : 32	68 : 95	66 : 47	67 : 16
7	92 : 68	21 : 22	12 : 16	33 : 14	33 : 5

Pereiopods 5, 6 (Figs 3c, d, Table 2) heavily spinose, article 2 with row of spines medio-laterally.

Pereiopod 7 (Fig. 3e, Table 2) miniaturized.

Uropods 1–3 (Fig. 4a–c) peduncle of uropod 1 with row of stout setae, inner ramus with lateral and apical spines, outer ramus lateral spines only ; peduncle of uropod 2 with stout setae, rami short with stout apical setae ; peduncle of uropod 3 with group of stout distal setae, rami long, sub-equal in length, outer ramus two-segmented, with plumose setae and a row of stout setae on outer edge.

Telson (Fig. 4g) cleft to base, each lobe with 6 stout apical setae.

Male. Length 5·4–7·1 mm. Sexual dimorphism typical.

MATERIAL EXAMINED.

Holotype, adult female, length 7·7 mm, carrying 7 eggs, collected at MLWN from intertidal sand on 13 April 1973, Baylys Beach, North Island, New Zealand. BM(NH) reg. no. 1976:166:1.

Paratypes, adults and juveniles collected at MLWN from intertidal sand on 13 April 1973, Baylys Beach, North Island, New Zealand. BM(NH) reg. nos. 1976:167:2 (adult females dissected, mounted in polyvinyl lactophenol with lignin pink on slides) ; 1976:168:10 ; adults and juveniles collected at HMB from intertidal sand on 19 November 1973, Paraparaumu Beach, North Island, New Zealand. BM(NH) reg. no. 1976:169:5.

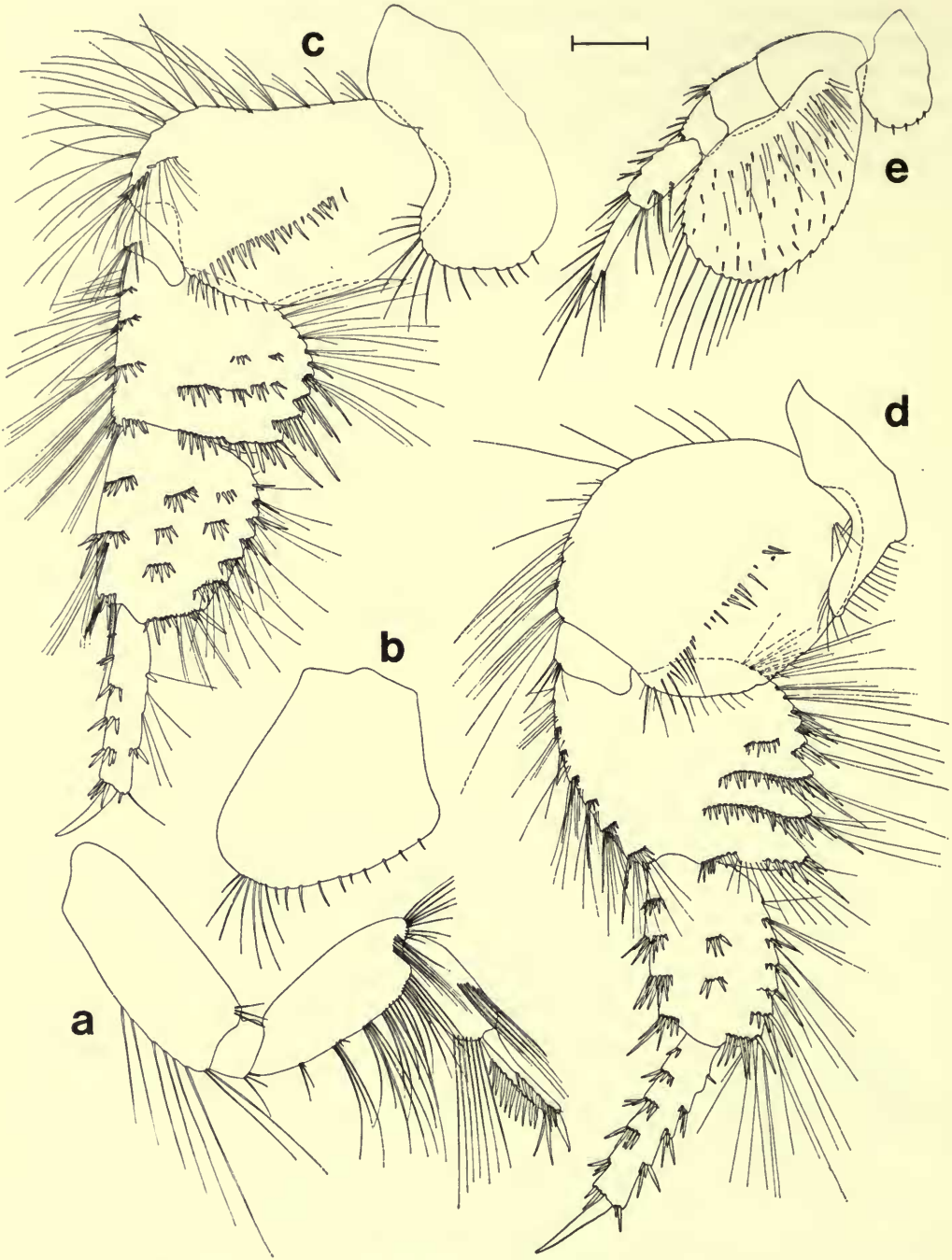

FIG. 3. *Waitangi brevirostris* n. sp. adult female. (a) pereiopod 4; (b) coxal plate 4; (c) pereiopod 5 and coxal plate 5; (d) pereiopod 6 and coxal plate 6; (e) pereiopod 7 and coxal plate 7. Bar scale = 0·4 mm.

Other material from intertidal sand HMB and MLWN Mt Maunganui, LMB Ohope Beach, North Island, New Zealand.

ETYMOLOGY. The species is named *brevirostris* in view of the extreme foreshortening of the rostrum.

REMARKS. In his paper on the Phoxocephalidae, Barnard (1960) describes evolutionary trends shown by the known genera and in diagrammatic form demonstrates progression from the 'basic' phoxocephalid form with broad rostral hood, narrow pereiopod 3 and obtuse palm of gnathopod 1 to the 'trichophoxid' form with rostrum narrowing abruptly, broad pereiopod 3 and right-angled palm of gnathopod 1. In the present new species these trends can be seen to have developed further ; the rostrum has virtually disappeared, pereiopod 3 is very broad and the palmar angle acute (the latter characters foreshadowed in the other, closely related New

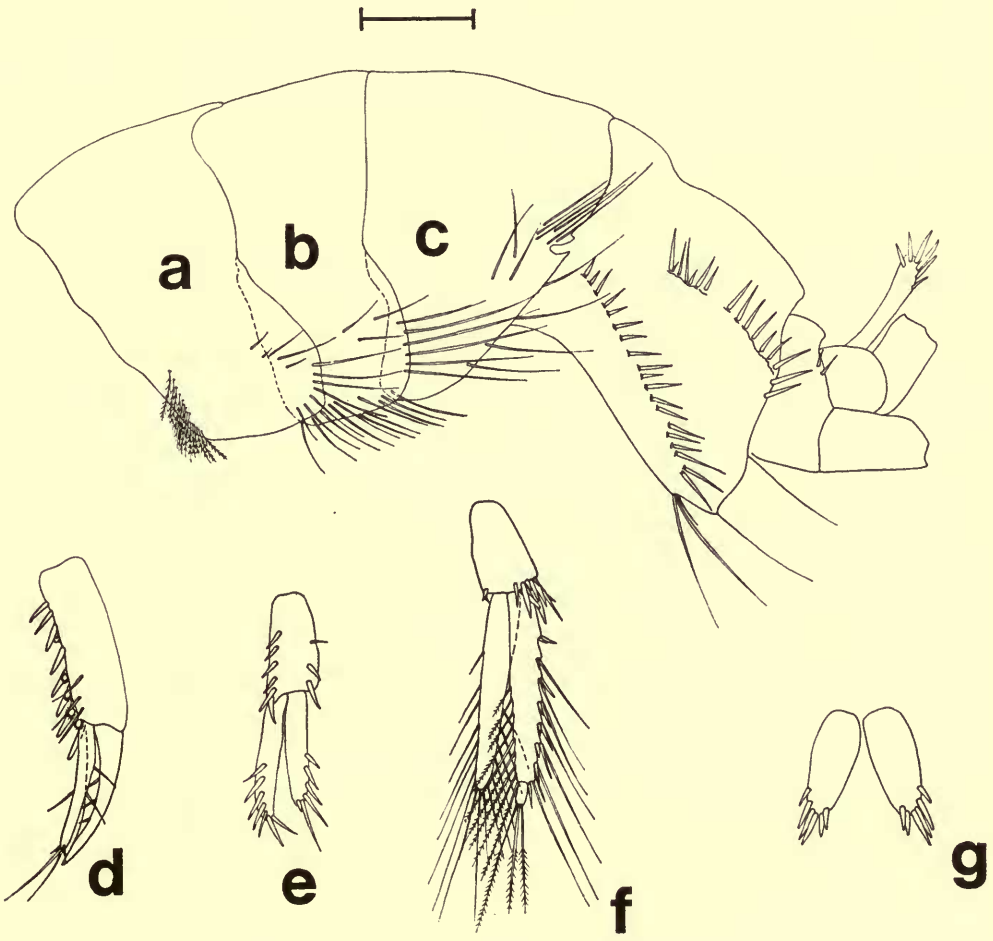

FIG. 4. *Waitangi brevirostris* n. sp. adult female. (a–c) epimeral plates 1–3 ; (d) uropod 1 ; (e) uropod 2 ; (f) uropod 3 ; (g) telson. Bar scale = 0·4 mm.

Zealand genus *Trichophoxus*). At first glance the present new species is much more 'haustoriid-like' than phoxocephalid. Barnard (1960) suggests that the genus *Paraphoxus* (now divided into several genera) offers the zoologist an opportunity to study '. . . evolution and the correspondence of morphology to specific environments'. It would appear that haustoriids dominate intertidal sand in the northern hemisphere but are replaced by phoxocephalids occupying the equivalent niche in the southern hemisphere. In both, however, the families co-exist.

On the basis of preliminary diagnoses, two further species of New Zealand phoxocephalids *Paraphoxus spinibasus* Cooper, 1974 and *P. chelatus* Cooper, 1974 should be transferred to different genera, tentatively *Trichophoxus* and *Waitangi* n. g. respectively but this can only be confirmed on publication of figures supporting the diagnoses. In common with *Paraphoxus chelatus* Cooper and *Waitangi rakiura* (Cooper & Fincham), *W. brevirostris* n. sp. has the distinctive narrowing of article 6 of the gnathopods, together with setae on article 2 of pereiopod 7 and the development of apical spines on the rami of uropods 1, 2. The closely related genus *Trichophoxus* has a terminal nail instead of these apical spines. *Waitangi brevirostris* n. sp. differs from the one other known species (and one surmised – *P. chelatus*) in the extreme abbreviation of the rostrum.

REFERENCES

Barnard, J. L. 1960. The amphipod family Phoxocephalidae in the eastern Pacific Ocean, with analyses of other species and notes for a revision of the family. *Allan Hancock Pacif. Exped.* **18** (3) : 175–368.

—— 1972. The marine fauna of New Zealand : algae-living littoral Gammaridea (Crustacea : Amphipoda). *Mem. N.Z. oceanogr. Inst.* No. 62 : 1–216.

—— & Drummond, M. M. 1976. Clarification of five genera of Phoxocephalidae (marine Amphipoda). *Proc. biol. Soc. Wash.* **88** (49) : 515–548.

Cooper, R. D. 1974. Preliminary diagnoses of three amphipod species from Wellington Harbour (Note). *N.Z. Jl mar. freshw. Res.* **8** (1) : 239–241.

—— & Fincham, A. A. 1974. New species of Haustoriidae, Phoxocephalidae, and Oedicerotidae (Crustacea : Amphipoda) from northern and southern New Zealand. *Rec. Dom. Mus. Wellington* **8** (12) : 159–179.

Fincham, A. A. 1974. Intertidal sand-dwelling peracarid fauna of Stewart Island. *N.Z. Jl mar. freshw. Res.* **8** (1) : 1–14.

—— In press. Intertidal sand-dwelling peracarid fauna of North Island. *N.Z. Jl mar. freshw. Res.*

Hurley, D. E. 1954. Studies on the New Zealand amphipodan fauna. No. 3. The Family Phoxocephalidae. *Trans. R. Soc. N.Z.* **81** (4) : 579–599.

—— 1956. Studies on the New Zealand amphipodan fauna. No. 13. Sandhoppers of the genus *Talorchestia*. *Trans. R. Soc. N.Z.* **84** (2) : 359–389.

—— 1957. Terrestrial and littoral amphipods of the genus *Orchestia*, family Talitridae. *Trans. R. Soc. N.Z.* **85** (1) : 149–199.

Dr A. A. Fincham
Department of Zoology
British Museum (Natural History)
Cromwell Road
London SW7 5BD